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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/533,483	03/27/2006	Koichi Furusawa	15250/006001	4037

22511 7590 12/04/2008

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EXAMINER	
PATEL, VIPIN	
ART UNIT	PAPER NUMBER
2873	

NOTIFICATION DATE	DELIVERY MODE
12/04/2008	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No.	Applicant(s)	
	10/533,483	FURUSAWA ET AL.	
	Examiner	Art Unit	
	VIPIN M. PATEL	2873	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *30 July 2008*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-36* is/are pending in the application.

4a) Of the above claim(s) *8-13,21-22, 25-27,36* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-7,14-20,23,24 and 28-35* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *29 April 2005* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *See Continuation Sheet*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

Continuation of Attachment(s) 3). Information Disclosure Statement(s) (PTO/SB/08), Paper No(s)/Mail Date :1/10/06, 4/26/07, 10/19/07, 5/20/08.

DETAILED ACTION

1. This action is in response to office communication received on 07/30/2008.

Drawings

2. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, "the wavelength selecting element" must be pointed out on the drawing and it should be explained in the detailed description area of the specification or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner,

the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

4. Claim 1-7, 14-15, 17-19 and 28-33 are rejected under 35 U.S.C. 102(e) as being anticipated by Grann et al.(6563976 B1).

Regarding **claim 1**, Grann et al. discloses (see fig. 1) An optical multiplexer/demultiplexer (abstract, line 1-5), wherein plurality of wavelength selecting elements (41, filter array) of which the transmission wavelength bands are different from each other and a light reflecting surface (49) are made to face each other, and thereby, an optical guiding means for guiding light by making light being reflected between the light reflecting surface and the respective wavelength selecting elements (41) and for multiplexing or demultiplexing light having different wavelengths is formed, a transmission means (18) for transmitting light having plurality of wavelengths is coupled to light having plurality of wavelengths or wavelength bands that is guided within the optical guiding means, plurality of light inputting/outputting means (25-28) are placed on

the same side as the transmission means relative to the optical guiding means in a manner where the direction of the optical axis becomes approximately perpendicular to the direction in which the wavelength selecting elements are aligned, and a deflection element for converting the direction of the optical axis of light that has transmitted through each of the wavelength selecting elements into one that is parallel to the direction of the optical axis of the respective light inputting/outputting means (vertical), or for converting light that is parallel to the direction of the optical axis of each of the light inputting/outputting means into the direction of the optical axis of light that transmits through each of the wavelength selecting elements is provided between each of the light inputting/outputting means and each of the wavelength selecting elements.

Regarding **claim 2**, Grann et al. discloses the optical multiplexer/demultiplexer wherein an antireflection film (column 7, line 65-68, application of AR coating on lens) is provided in the middle of the light path between the transmission means and the optical guiding means.

Regarding **claim 3**, Grann et al. discloses An optical multiplexer/demultiplexer, comprising: an optical guiding means (40) which is made of (40) a light reflecting surface (49) and plurality of wavelength selecting elements (filter array) which are aligned in a plane that is parallel to the light reflecting surface (49), and of which the transmission wavelength bands are different from each other, which guides light by making light be reflected between the light reflecting surface and the respective wavelength selecting elements (filter array) , and which multiplexes or demultiplexes light having different wavelengths; an optical fiber array (20) where a first optical fiber

(18) for transmitting light having plurality of wavelengths or wavelength bands and plurality of second optical fibers for transmitting light having particular wavelengths (25-28) or wavelength bands are aligned in a manner where the optical axis of each optical fiber becomes approximately perpendicular to the plane in which the wavelength selecting elements are aligned; and one or more deflection element (lens array) for bending the direction of the optical axis of transmitting light, which are placed so as to face the first and second optical fibers, wherein the first optical fiber is coupled to light having plurality of wavelengths that diagonally enters into or is emitted from the optical guiding means via the deflection element, and the second optical fibers are respectively coupled to light having respective wavelengths that diagonally enters into or is emitted from the optical guiding means via the deflection elements (as shown rays in element 40 and 41 in the drawing 1)..

Regarding **claim 4**, Grann et al. discloses (see Fig. 1) the optical multiplexer/demultiplexer wherein the deflection element (lens array 30) is joined to and integrated with an end surface of the optical fiber array (24).

Regarding **claim 5**, Grann et al. discloses (see Fig. 1) the optical multiplexer/demultiplexer wherein the optical guiding means, the deflection element (lens array) and the optical fiber array (24) are contained within a case so as to be sealed.

Regarding **claim 6**, Grann et al. discloses (see Fig. 1) An optical multiplexer/demultiplexer, comprising: an optical guiding means (40) which is made of (40) a light reflecting surface (49) and plurality of wavelength selecting elements (filter

array) which are aligned in a plane that is parallel to the light reflecting surface (49), and of which the transmission wavelength bands are different from each other, which guides light by making light be reflected between the light reflecting surface and the respective wavelength selecting elements (filter array) , and which multiplexes or demultiplexes light having different wavelengths; a transmission means (18) for transmitting light having plurality of wavelengths of which the optical axis is placed so as to be approximately perpendicular to the plane in which the wavelength selecting elements (filter array) are aligned; plurality of light emitting elements (Laser diode 10,12,14,16) for respectively outputting light having particular wavelengths (λ1- λ 4) of which the optical axes are placed so as to be approximately perpendicular to the plane in which the wavelength selecting elements are aligned; and one or more deflection element (lens array) for bending the direction of the optical axis of transmitting light which is placed so as to face the transmission means and the light emitting elements, wherein the transmission means is coupled to light having plurality of wavelengths that is diagonally emitted from the optical guiding means via the deflection element, and the light emitting elements emit light having respective wavelengths via the deflection element so that light diagonally enters into the optical guiding means.

Regarding **claim 7**, Grann et al. discloses (see Fig. 13), An optical multiplexer/demultiplexer, comprising: an optical guiding means (230) which is made of a light reflecting surface (236) and plurality of wavelength selecting elements (233-234) which are aligned in a plane that is parallel to the light reflecting surface, and of which the transmission wavelengths are different from each other, which guides light by

making light be reflected between the light reflecting surface and the respective wavelength selecting elements, and which multiplexes or demultiplexes light having different wavelengths; a transmission means (212) for transmitting light having plurality of wavelengths ((λ1- λ 2) of which the optical axis is placed so as to be approximately perpendicular to the plane in which the wavelength selecting elements are aligned; plurality of light receiving elements (214, 216) of which the optical axes are placed so as to be approximately perpendicular to the plane in which the wavelength selecting elements are aligned; and one or more deflection element (lens array, 225-226) for bending the direction of the optical axis of transmitting light which is placed so as to face the transmission means and the light receiving element, wherein the transmission means (210) is coupled to light having plurality of wavelengths that diagonally enters into the optical guiding means (223) via the deflection element and the light receiving elements (214, 216) respectively receive light having respective wavelengths that is diagonally emitted from the optical guiding means via the deflection element.

Regarding **claim 14**, Grann et al. discloses (see Fig. 13), The optical multiplexer/demultiplexer, wherein the optical guiding means (230) has the respective wavelength selecting elements (231, 234) formed on the front surface of a transparent substrate and the light reflecting surface (236) formed on the rear surface of the transparent substrate.

Regarding **claim 15**, Grann et al. discloses (see Fig. 13), The optical multiplexer/demultiplexer, wherein the optical guiding means has a transparent second substrate (220) where plurality of the wavelength selecting elements are aligned on the

front surface joined to a transparent first substrate (230) where the light reflecting surface is formed on the rear surface (236).

Regarding **claim 17**, Grann et al. discloses (see Fig. 13), the optical multiplexer/demultiplexer, wherein the optical guiding means (230) has the respective wavelength selecting elements (231-234) formed between a pair of transparent substrates that overlap and has the light reflecting surface (236) formed on the rear surface of the substrate (230) that is located on the rear surface side of the substrates.

Regarding **claim 18**, Grann et al. discloses (see Fig. 13), the optical multiplexer/demultiplexer, wherein the surface of the optical guiding (230) means, on which the wavelength selecting elements are formed (234), and the deflection element (221-226) are made to face each other with a spacer (gap between 231-234 and 221-226) intervening between the optical guiding means and the deflection element (221-226).

Regarding **claim 19**, Grann et al. discloses (see Fig. 13), the optical multiplexer/demultiplexer, wherein the spacer (gap between 220 and 230) is formed so as to be integrated with the deflection element (221-226).

Regarding **claim 28**, Grann et al. discloses (see abstract line 1-4) The optical multiplexer/demultiplexer according to claim 1, 3, 6, 7, 8, 10, 13, 21 or 22, wherein the wavelength selecting elements are formed of filters (filter array) or diffraction elements.

Regarding **claim 29**, Grann et al. discloses A manufacturing method for an optical multiplexer/demultiplexer that comprises an optical guiding means (40) which is made of a light reflecting surface (49) and plurality of wavelength selecting elements

(42) which are aligned in a plane that is parallel to the light reflecting surface, and of which the transmission wavelengths are different from each other, which guides light by making the light be reflected between the light reflecting surface and the respective wavelength selecting elements, and which multiplexes or demultiplexes light having plurality of wavelengths, wherein the optical guiding means is fabricated according to: the step of forming a wavelength selecting element layer by aligning plurality of the wavelength selecting elements in thin film form of which the transmission wavelength bands are different from each other on a transparent substrate (40) where the light reflecting surface is formed on the rear surface (49); and the step of joining another transparent substrate to the surface of the wavelength selecting element (42,44,46,48) layer so as to place the wavelength selecting element layer in between the substrates that make up a pair.

Regarding **claim 30**, Grann et al. discloses (see Fig. 2-4) a manufacturing method for an optical multiplexer/demultiplexer that comprises an optical guiding means (80) which is made of a light reflecting surface (89) and plurality of wavelength selecting elements (82,84,86,88) which are aligned in a plane that is parallel to the light reflecting surface (89), and of which the transmission wavelengths are different ($\lambda 1$- $\lambda 4$) from each other, which guides light by making the light be reflected between the light reflecting surface and the respective wavelength selecting elements, and which multiplexes or demultiplexes light having plurality of wavelengths, wherein plurality of optical guiding means (61-68) are fabricated by cutting a pair of parent substrates that have been layered after placing a wavelength selecting element layer that has been

formed by aligning plurality of the wavelength selecting elements in thin film form of which the transmission wavelength bands are different from each other in between the parent substrates in an integrating manner (see Fig. 4a).

Regarding **claim 31** Grann et al. discloses a manufacturing method (see Fig. 1-4) for an optical multiplexer/demultiplexer that comprises an optical guiding means (fig. 4a, 80) which is made of a light reflecting surface (89) and plurality of wavelength selecting elements (82,84,86,8) which are aligned in a plane that is parallel to the light reflecting surface (89), and of which the transmission wavelengths are different from each other, which guides light by making the light be reflected between the light reflecting surface and the respective wavelength selecting elements, and which multiplexes or demultiplexes light having plurality of wavelengths (λ1- λ4), wherein the optical guiding means (61, 62, 64, 66, 68) is fabricated according to the step of forming a wavelength selecting element layer by aligning plurality of the wavelength selecting elements in thin film form of which the transmission wavelength bands are different from each other (λ1- λ4) on a transparent substrate (70, 80) where the light reflecting surface is formed on the rear surface.

Regarding **claim 32**, Grann et al. discloses (see Fig. 1-4) A manufacturing method for an optical multiplexer/demultiplexer that comprises an optical guiding means (80) which is made of a light reflecting surface (89) and plurality of wavelength selecting elements (82,84,86,88) which are aligned in a plane that is parallel to the light reflecting surface, and of which the transmission wavelengths are different from each other(λ1- λ4), which guides light by making the light be reflected between the light

reflecting surface and the respective wavelength selecting elements, and which multiplexes or demultiplexes light having plurality of wavelengths (λ1- λ4), wherein the optical guiding means is fabricated according to: the step of forming a wavelength selecting element layer (filter array), by aligning plurality of the wavelength selecting elements in thin film form of which the transmission wavelength bands are different from each other (λ1- λ4) on a transparent second substrate (80); and the step of joining the second substrate to a transparent first substrate where the light reflecting surface is formed on the rear surface (89).

Regarding **claim 33**, Grann et al. discloses (see fig. 1-4) A manufacturing method for an optical multiplexer/demultiplexer that comprises an optical guiding means (80) which is made of a light reflecting surface and plurality of wavelength selecting elements (82,84,86,88) which are aligned in a plane that is parallel to the light reflecting surface (89), and of which the transmission wavelengths are different from each other (λ1- λ4), which guides light by making the light be reflected between the light reflecting surface and the respective wavelength selecting elements, and which multiplexes or demultiplexes light having plurality of wavelengths (λ1- λ4), wherein the optical guiding means is fabricated according to: the step of forming plurality of the wavelength selecting elements (82,84,86,88) in thin film form of which the transmission wavelength bands are different from each other (λ1- λ4) on plurality of transparent second substrates (80), respectively; and the step of aligning and joining plurality of the second substrates having the wavelength selecting elements of which the transmission

wavelength bands are different from each other on and to a transparent first substrate where the light reflecting surface (89) is formed on the rear surface.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claims 16, 34 and 35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Grann et al. (6563976 B1)

Regarding **claim16 and 34**, Grann et al. discloses see Fig. 13 the optical multiplexer/demultiplexer wherein the optical guiding means has transparent second substrates (220) where the wavelength selecting elements (214) are individually formed on the respective front surfaces (200) aligned on and joined to a transparent first substrate (230) where the light reflecting surface (236) is formed on the rear surface.

Grann et al. does not disclose plurality of transparent second substrates.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to make plurality of transparent second substrates since it has been held that constructing a formerly integral structure in various elements involves only routine skill in the art. Nenvin v. Erlichman, 168 USPQ 177, 179.

Regarding **claim 35**, Grann et al. discloses the manufacturing method for an optical multiplexer/demultiplexer according to claim 33, wherein the wavelength selecting elements of which the transmission wavelength bands are different from each

other(λ1- λ4), are formed on substrates, and these parent substrates are aligned so as to be cut in a collective manner, and thereby, pairs of second substrates, where the wavelength selecting elements of which the transmission wavelength bands are different from each other are formed, are formed in the step of forming the wavelength selecting elements on the second substrates.

Grann et al. does not disclose plurality of transparent second substrates.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to make plurality of transparent second substrates since it has been held that constructing a formerly integral structure in various elements involves only routine skill in the art. Nenvin v. Erlichman, 168 USPQ 177, 179.

7. Claims 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Grann et al. (6563976 B1) in view of Kazufumi et al. (4523102 A)

Regarding **claim 20**, Grann et al. discloses the optical multiplexer/demultiplexer according to claim 1

Grann et al. does not disclose the surfaces of the respective wavelength selecting elements are coated with a protective layer.

Kazufumi et al. discloses the protective layer coating to optical filter.

It would have been obvious to one of the ordinary skill in the art at the time the invention was made to incorporate protective coating as disclosed by Kazufumi et al. applied to optical filter of Grann et al. in order to avoid flaws on surfaces. (Abstract line 16-20)

8. Claims 23 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Grann et al. (6563976 B1) in view of Jiang et al. (6901221)

Regarding **claim 23 and 24**, Grann et al. discloses the optical multiplexer/demultiplexer according to claim 1.

Grann et al. does not disclose the deflection elements are formed of lenses which are not rotationally symmetrical around their center axes.

Jiang et al. discloses (see Fig. 1) the deflection elements (lens 120-123) are formed of lenses which are not rotationally symmetrical (asymmetric, column 7, line 4-8) around their center axes.

It would have been obvious to one of the ordinary skill in the art at the time the invention was made to incorporate asymmetric lens as disclosed by Jiang et al. into the multiplexer/demultiplexer of Grann et al. in order to provide optical steering (column 7, line 4-8).

Regarding **claim 24**, Jiang et al. discloses (see Fig. 1) the deflection elements (lens 120-123) are formed of spherical lenses (column 7, line 4-10, ball lens, aspheric lens), aspherical lenses or anamorphic lenses where the centers in the cross sections of transmitting light fluxes are shifted from their optical axes (inherent to aspherical asymmetric lens).

Conclusion

9. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Mcqudd et al. (4671603), Goodman (6542306B2), Morris Jr. et al. (6684010 B1), and Lemoff et al. (6198864 B1).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to VIPIN M. PATEL whose telephone number is (571)270-1742. The examiner can normally be reached on Monday through Friday, 7:30AM to 5:00PM E.S.T..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ricky Mack can be reached on (571) 272-2333. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

VP

/Vipin M Patel/
Examiner, Art Unit 2873
11/23/2008

/Ricky L. Mack/
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